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Attorneys for Plaintiffs and the Proposed Classes

UNITED STATES DISTRICT COURT

NORTHERN DISTRICT OF CALIFORNIA

OAKLAND DIVISION

STACIA STINER, et al., on behalf of themselves and all others similarly situated,

Plaintiffs,

vs.

BROOKDALE SENIOR LIVING, INC.; BROOKDALE SENIOR LIVING COMMUNITIES, INC.; et al.,

Defendants.

Case No. 4:17-cv-03962-HSG (LB)

DECLARATION OF DALE SCHROYER IN SUPPORT OF PLAINTIFFS' MOTION FOR CLASS CERTIFICATION

Date: May 26, 2022
Time: 2:00 p.m.
Place: Courtroom 2
Judge Hon. Haywood S. Gilliam, Jr.

REDACTED

DECLARATION OF DALE SCHROYER

1. I, Dale Schroyer, declare as follows:

2. I am over the age of 18 and I am competent to testify to the matters stated in this declaration. If called and sworn as a witness I can and will to testify, based on my personal knowledge, to those matters set forth below.

3. This declaration contains 12 sections. A list of these sections and the corresponding pages number are set forth in the Table of Contents that follows.

I. Introduction 1
II. ProModel/MedModel 4
III. Qualifications and Simulation Background..............................12
IV. Summary of Key Findings...18
V. Overview: The Basis for MedModel's DES Testing...............19 and Failure Analysis of Brookdale Facilities
VI. Brookdale Facility Specific Raw Data and Floor Plans 19
VII. Summaries of Voluminous Facility-Specific Raw Data...........22 for the Selected Brookdale Facilities
VIII. Brookdale Policy and Practice Documents 28
IX. General Inputs and Programming Logic 29
X. Validation and Calibration of MedModel DES Testing...........38 and Failure Analysis of Brookdale Facilities
XI. MedModel DES Testing and Failure Analysis.........................41 of Brookdale Facilities
XII. Approach for Analyzing Other Brookdale ....58 California Facilities

I. INTRODUCTION

4. I am currently employed as a systems engineer and Senior Consultant by ProModel/MedModel where for over 20 years I have been professionally responsible for the design, testing, and operation of discrete event simulation (DES)

models built upon ProModel/MedModel software. This ProModel/MedModel analytic tool and computational software is widely-used by the military and in the healthcare, manufacturing, pharmaceutical, and service industries to mathematically determine:

a. the *minimum amount of labor time or staff resources required* in a workplace to perform all defined work tasks during a set timeframe,

b. the *maximum work capacity* of a set number of staff (i.e. the maximum amount of work tasks (care services) that can be performed by a precise number of workers during a defined timeframe), and

c. the quantity of tasks (care services), if any, that cannot possibly be performed during a set timeframe by a set number of staff due to workload exceeding maximum work capacity.

5. This computational analysis and these key metrics are used across the healthcare, manufacturing, pharmaceutical, and service industries to inform operational decisions about staffing and resource allocation, deployment, and utilization, as well as to provide solutions that improve efficiency, productivity, and throughputs.

6. My job, as a systems engineer, is to break down a work system into discrete work tasks, identifying each task that requires work time during a workday, understanding how much time workers spend on each task, and defining and capturing every realistic variable that impacts task performance and work completion. These objectively verifiable facts are inputted into an engineering analytic tool known as Discrete Event Simulation (DES). A discrete event simulation (DES) is an industrial engineering tool that reproduces a work system by virtual modelling and digitally recreating all elements of that system, in order to test and measure the capacity of the resources to perform the work required. A staffing DES provides a method of accurately analyzing and mathematically determining, in even

the most complex systems, how much work can be completed when the amount of resources or other operational conditions are modified.

7. ProModel/MedModel[1] was engaged in this case to apply the same methodologies routinely used by the military and in the healthcare, manufacturing, pharmaceutical, and service industries to scientifically determine and quantify (a) the minimum amount of labor (staff) time required on a per day basis at Brookdale California facilities to deliver all care task and services (documented as required in each resident's assessments), (b) the *maximum work capacity* of a set number of Brookdale staff *(i.e.*, the maximum amount of work tasks (care services) that can be performed by a set number of Brookdale staff during a defined timeframe), and (c) the quantity of work tasks (care services), if any, that cannot possibly be performed during a set timeframe by a set number of staff due to the workload exceeding maximum work capacity.

8. As part of this engagement, ProModel/MedModel performed engineering tests and failure analyses for 6 selected Brookdale facilities in order to determine if Brookdale allocated enough staff hours to provide the care services documented as being required in its resident assessments.

9. It is my understanding that Plaintiffs' counsel has requested complete resident assessment data for all Brookdale California facilities, the move-out dates for any resident of these facilities (*i.e.*, if any resident moved-out of a Brookdale California facility, the move-out date for such resident), and punch detail staffing data for employees of these facilities. It is also my understanding that to date, Brookdale has not produced all requested data. More specifically, I have been informed by Plaintiffs counsel that Brookdale has not produced complete resident assessment data and move-out data for all its California facilities to date and that more data is expected to be produced by Brookdale in the future. Assuming that

[1]MedModel is the healthcare-specific application of ProModel's analytic and computational engineering software.

Brookdale produces all requested data, the same DES engineering methodology, testing and failure analysis that was performed for these 6 selected facilities can be performed for all the other Brookdale California facilities.

II. PROMODEL/MEDMODEL

10. **Who Is ProModel/MedModel**: ProModel/MedModel is a leading simulation[2] analytics company whose DES testing and computational software is used and relied upon by the U.S. military, manufacturing and service industries, and healthcare institutions across the country. ProModel/MedModel's DES testing and computational software measures and determines if (a) it is mathematically and physically possible for the number of workers scheduled on a job to handle the assigned workload (i.e. complete every task required to be performed) and (b) what quantity of work can and cannot be performed when different numbers of workers (or resources) are allocated to a job.

11. **Use of ProModel Simulations in Academia**: ProModel's computational and engineering software is taught and used by leading engineering schools & research institutions across the country. Over 80 universities and research institutions in North America are teaching DES using the ProModel platform. These include the MIT Sloan School of Management, McGill University, University of Michigan - Ann Arbor, University of Southern California, University of Texas – Austin, Yale University, University of Southern California, California State – Hayward, Clemson University, CalPoly Pomona, San Jose State University, California State University – Fresno, University of California--Los Angeles, and Central Washington University CWU - Des Moines.

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[2] Computers have been used to simulate reality with increasing frequency and sophistication since the first large-scale deployment during the Manhattan Project in World War II, when simulations were used to model the process of nuclear detonation.

12. **Using DES to Perform Failure Analysis and Test Staffing Levels**: Discrete Event Simulations are particularly appropriate for testing staffing levels and performing workload and workforce failure analysis. DES has long been used for these purposes in testing a wide array of work-place systems, including healthcare systems. Staffing simulations help decision-makers analyze and understand workload patterns and staffing needs that are not easily recognized or commonly understood. One of the advantages of DES analysis is that it allows thousands of realistic work scenarios to be tested, varying, for example, the times that services are to be provided in order to determine the most efficient schedule that results in the most work performed by the same number of staff. Further, DES analysis of staffing is particularly helpful when incorrect staffing decisions or invalid workload and time study assumptions can have risky or dangerous real-world consequences. By being able to safely simulate staffing levels, proposed decisions can be tested to determine the point at which a work system begins to fail, without risk of injury. Discrete event simulation modeling is widely-used and generally-accepted by the scientific and professional community as a reliable tool for testing and determining (1) capacity of a defined number of staff (the workforce) to meet the demands imposed by the work system and (2) the percent of services that are physically possible or impossible (*i.e.*, failed or omitted).

13. ProModel's computational software calculates how many workers are needed to perform a defined set of job tasks. The U.S. military, leading manufacturing and service companies, and healthcare institutions across the country use and depend upon ProModel for such determinations. ProModel's computational software measures and determines if it is physically possible for the number of workers scheduled on a job to handle the assigned workload (*i.e.*, perform all essential tasks in a defined amount of time).

14. **Use of ProModel Staffing Simulations in the Military**: For over 25 years, the United States Department of Defense has depended upon ProModel to

determine the number of soldiers, support personnel, and resources needed to successfully complete missions. The ProModel software has been used and relied upon by all branches of the United States military, including the Army, Navy, Air Force, Marines, the Joint Chiefs of Staff, The Center for Army Analysis, Special Forces, the Naval Air Warfare Center, and the Naval Air Systems Command. Further, ProModel software is accredited by the United States Department of Defense as the authoritative, proven, and exclusive system of record on the Army Classified Network for determining the number and type of Army units and associated military personnel that are needed for every Army mission. The Army has mandated, for every mission conducted over the past 10 years, that ProModel's software be used to test and determine the number, timing and type of Army units and personnel required.

15. **Use of ProModel Staffing Simulations in the Manufacturing and Service Industries**: For over 25 years, ProModel software has been used by companies across the United States to make decisions regarding staffing resources and operational design and determine the capacity of resources to meet workload demands. There are now over 4,000 users of ProModel technology. ProModel is used and relied upon by over half of the Fortune 500. A few examples of companies that use ProModel software include: FedEx, Ford, John Deere, Timex, General Electric, DuPont, Boeing, Harley Davidson Motor Company, General Motors, Whirlpool Corporation, CocaCola, IBM, JetBlue, and Lockheed Martin. In California, the following companies use ProModel: Raytheon, Rolls Royce, Pfizer – La Jolla, Oculus, Bumble Bee Foods, LLC, and Wells Fargo.

16. **Use of ProModel/MedModel Staffing Simulations in Healthcare**: For over 25 years, ProModel/MedModel computational software has been used and relied upon by hospitals, emergency rooms, medical clinics, and other healthcare facilities across the country to make decisions regarding staffing resources and operational design and determine the capacity of resources to meet workload demands. More hospitals use MedModel than all other simulation software

combined. Examples of MedModel users in healthcare include: Mayo Clinic, Texas Children's Hospital, John Hopkins Hospital, Massachusetts General Hospital, MIT; Harvard Medical School Teaching Hospital, Stanford Hospital & Clinics, University of Arkansas Medical Center, MD Anderson Cancer Network, Emory Healthcare, Children's National Medical Center, Kaiser Permanente, Baylor Health Care System, Cleveland Clinic, UNC-Chapel Hill Medical Center, HCA Hospitals, Providence Health Systems, OSU Medical Center, UVA Medical Center, UAB-Birmingham Medical Center, Seattle Children's Hospital, and Swedish Medical Center Seattle. In California, healthcare users include: AltaMed, Stanford Medical Center, Stanford Blood Center, Verb Surgical, HOAG: Hospital Foundation, University of California, and San Diego Medical Center.

17. **Use of ProModel/MedModel Software to Determine How Much Staff Time Is Required to Provide Care and Services in Long-Term Care Facilities**: Since at least 2000, MedModel computational software has been used to determine the capacity of nursing home staff to meet the care needs of the facility's resident population. The Centers for Medicare and Medicaid Services and principal researcher Dr. John F. Schnelle used and relied upon MedModel to digitally model and reproduce the operation of nursing homes to mathematically test the effect that different numbers of staff have on the delivery of basic care to residents. More specifically, MedModel was used to mathematically determine (1) what happens to the delivery of basic care when the nurse aide-to-resident ratios are increased or decreased in low, medium, and high workload nursing homes and (2) the minimum staffing ratios and hours required to provide the basic care needed by residents. For purposes of this extensive study, the basic care examined and modeled on Med/Model's software platform was toileting, incontinent care, repositioning, feeding, bathing, AM/PM care (including dressing, transferring, and personal hygiene), exercise, and range of motion provided by CNAs. The results of this study were published by CMS in December 2001 in the *Phase II Final Report* regarding

the *Appropriateness of Minimum Nursing Staff Ratios in Nursing Homes*, which was submitted to the United States Congress ("Phase II Report"). With respect to the MedModel-based Phase II simulation findings, CMS reported to the United States Congress that:

> "The simulation models do not create data to predict theoretical outcomes nor are they based on theoretical 'unknowns.' On the contrary, they take what is known and use these 'givens' to **mathematically predict outcomes, usually with a high degree of accuracy**."
>
> Using simulation analytic strategies, **labor-intensity data can be converted mathematically** into estimates of minimum staffing ratios needed."

[Emphasis added].

Further, in 2004, the Institute of Medicine (National Academy of Sciences) in its report entitled Keeping Patients Safe adopted staffing standards based on Dr. Schnelle's Phase II work. The reliance by CMS on the MedModel software and the subsequent adoption of the MedModel results by the Institute of Medicine affirms this technology's general acceptance.

18. **Use of MedModel in Assisted Living Facilities**: MedModel software can be and has been applied to reliably test how many staff are required to provide care and services to residents in assisted living facilities. In 2012, MedModel testing was used by a chain in Minnesota to: (1) determine the maximum care capacity of staff at its assisted living facilities and nursing homes, (2) determine at which point resident workload exceeded staffing capacity and resulted in failure to deliver services (failure analysis), and (3) assist that chain in making staffing decisions. Further, the use of discrete event simulation in assisted living facilities to objectively determine the amount of staffing required based on the unique needs of a patient

population was acknowledged to be an accepted methodology in the peer-reviewed publication The Gerontologist (2017):

> Given the availability of time data similar to that reported in this study for all aspects of daily care, common staffing methodologies, such as those based on *discrete event simulation modeling*, could be used to objectively determine the most optimal staffing model for an individual facility based on their unique resident population." (citing Schnelle, Schroyer, Saraf, & Simmons, 2016). Given the similarities between the NH resident population and those receiving dementia care services in ALFs (Zimmerman et al., 2013), we believe this approach is equally applicable to the ALF care setting." (emphasis added).

Managing Person-Centered Dementia Care in an Assisted Living Facility: Staffing and Time Considerations, Simmons, Coelho, Sandler, Shah and Schnelle, Gerontologist, 2017, Vol. 00. No. 00, 1-9, doi:10.1093/geront/gnx089.

19. As discussed previously, basic care services such as toileting, incontinent care, feeding, bathing, dressing, transferring, and personal hygiene which are provided by assisted living facilities to assisted living residents (unable to perform the same) have been the subject of extensive DES testing and analysis by ProModel/MedModel in numerous nursing homes. Further, the nursing care, treatments, and medications required to be provided by assisted living staff to assisted living residents are similar to the care, treatments, and medications modeled, measured, and analyzed by ProModel/MedModel in emergency rooms, hospitals, and other healthcare facilities.

20. **<u>What Do All These ProModel/MedModel Computational Analyses Have in Common?</u>:** Regardless of the industry or workplace where applied, ProModel/MedModel's staffing DES is grounded in the same methods and procedures of science, industrial engineering, and mathematics. ProModel/MedModel's software and staffing analyses is particularly well-suited to

an examination and study of repetitive tasks performed in any workplace by a known number of workers over a known amount of time and distance. For example:

a. *Using DES to Analyze Staffing Levels*: DES is particularly appropriate for use in analyzing staffing levels for virtually any type of workplace system, including healthcare systems, and simulations have long been used for that purpose. Such staffing DES is quite useful in helping decision-makers understand staffing needs and patterns that are not easily recognized or commonly understood. Staffing DES is particularly helpful when incorrect staffing decisions could have risky or dangerous real-world consequences. By being able to safely simulate staffing levels, proposed decisions can be tested without fear of injury. A wide variety of industries, including health care, rely on DES to determine: (1) capacity of staff to meet the demands imposed in the workplace and (2) proportion of services provided and omitted.

b. *Methodological Similarities Between All Staffing DES Analyses*: The basic methodology used to create staffing DES is the same across industries and simulation platforms/software. When a specific number of staff is required to perform a defined number or combination of tasks with associated, defined labor time costs in certain physical locations at defined distances within a specific period of time, a valid computer staffing simulation can be created.

c. *Formulae Common to Staffing DES*: Staffing DES analyses use an array of simple logic, math, statistical concepts, and user defined distributions to account for variation, priority and structure. These include how long a specific task takes to complete, how long it takes to travel from one point to another, what tasks must be done, and how many staff members are available to do the work.

21. **Peer-Review of MedModel and ProModel Software**: Discrete event simulation technology is and has been widely used by the healthcare research

community and is generally accepted as a reliable method for analyzing the capacity of a resource to meet a need. The use of simulations created using *specifically* MedModel and ProModel have appeared in numerous scholarly journal articles subject to peer review, including but not limited to:

a. Schnelle JF, Schroyer LD, Saraf AA, Simmons SF (2016), "Determining Nurse Aide Staffing Requirements to Provide Care Based on Resident Workload: A Discrete Event Simulation Model," *17 Journal of the American Medical Directors Association pp. 970-977* (cited as *Schnelle 2016 JAMDA)*;

b. "Simulation Success: Software Improves Practice Efficiencies," Medical Group Management Association's *MGMA Connexion*, March 2011, page 19;

c. Cancelarich Joe, (2011) "Building a Modeling Culture in Manufacturing at Pfizer," *Pharmaceutical Manufacturing*;

d. Day TE, Li WM, Ingolfsson A, Ravi N, (2010) "The Use of Queuing and Simulative Analyses to Improve an Overwhelmed Pharmacy Call Center," *Journal of Pharmacy Practice*, 23(5) (in press);

e. Levin SR, Dittus R, (2008), "Optimizing cardiology capacity to reduce emergency department boarding: A systems engineering approach," *American Heart Journal* (article in press); and

f. Khare RK, Powell ES, (2008), "Adding More Beds to the Emergency Department or Reducing Admitted Patient Boarding Times: Which Has a More Significant Influence on Emergency Room Congestion?," *Annals of Emergency Medicine*.

As is the case with the CMS' conclusions based on the MedModel computational software set out in Phase II Report to Congress (discussed above), these peer-reviewed articles confirm the general acceptance of ProModel/MedModel's computational analysis.

22. **General Acceptance by the Relevant Scientific Community**: MedModel's computational DES software is generally accepted by the relevant community of scientists expected to be familiar with its use. The relevant scientific community is comprised of scientists who use computer simulations in the field of management science. Based on its long history of use by numerous reputable entities, including prestigious universities, the U.S. Military, Fortune 500 companies, and leading healthcare companies, MedModel's programming platform is a reliable tool and generally accepted by this relevant scientific community.

23. **MedModel Can Be Used to Quantify the Amount of Care Time Required and Omitted at Brookdale's Assisted Living Facilities**: Like the various DES testing in other settings described above, the MedModel assisted living DES testing and failure analysis performed regarding the Brookdale facilities is grounded in the same methods and procedures of science, industrial engineering, and mathematics, and it has been subjected to the same intellectual rigor, scientific methodology, and industrial engineering principles.

24. MedModel's simulation software provides a well-established methodology to reliably determine the amount of care time required per day in Brookdale's assisted living facilities and quantify the extent to which available staff time was sufficient or insufficient.

III. QUALIFICATIONS AND SIMULATION BACKGROUND

25. I have extensive experience in the use of DES testing and failure analysis to determine the capacity of a defined number of staff to provide care and services to residents in assisted living facilities and am qualified to conduct such testing and analysis.

26. **Education and Experience**: I graduated from the University of Michigan -- Ann Arbor in 1977 with a Bachelor of Science degree in Mechanical Engineering. In 1995, I obtained a Master's degree in Management Science from

Lesley University in Cambridge, Massachusetts. As discussed below, since the mid-1990s I have had extensive experience with discrete event simulations.[3]

a. Aerospace Employment: From 1980 to 1994, I was a Project Engineer at the Hamilton Sundstrand Division of United Technologies. Hamilton Sundstrand is a global enterprise with various business units that design, manufacture, and support aerospace and industrial products for worldwide markets. It is the prime contractor for NASA's space suite/life support system and produces environmental control, life support, mechanical systems, and thermal control systems for international space programs.

b. At Hamilton Sundstrand, my work included serving as internal consultant for operations improvement for the engineering and operations departments, reporting to the Vice- President of Engineering and Operations. This work included statistical process control, IS0-9000 certification, and total productive maintenance. Part of my responsibilities at Hamilton Sundstrand was to perform kinematic simulations of the three-dimension Computer Aided Drafting models of machinery designs to ensure they met performance requirements prior to initiating prototyping of the new design.

c. Health System Employment: From 1994 to 2000, I served as a Senior Corporate Management Engineering Consultant for Baystate Health System in Springfield, Massachusetts. Baystate Health System has nearly 10,000 employees and operates some 783 beds in 4 hospitals. I was hired by Baystate Health System specifically for my simulation experience since they had already made the decision to simulate using MedModel key major revisions to their health system and needed someone with simulation experience who understood the requirements of properly defining a simulation model and

[3] *See* my *curriculum vitae* that sets forth my qualifications, MEDMODEL0001, and my prior deposition and trial testimony, MEDMODEL0002.

correctly interpreting the output results. In this capacity, I facilitated quality improvement efforts throughout the System including setting standards, facilitating business re- engineering teams, information systems analysis, and performing discrete event simulations using the ProModel/MedModel engine and computational software. ProModel DES testing was used as a tool for decision-making and educating the management team about the consequences of proposed actions. From the mid-1990s to 2000, I simulated various actions proposed by management. This allowed us to understand the effect of those actions without putting patients at risk.

d. ProModel/MedModel: In 2000, I began working for ProModel Corporation as a Senior Consultant in the Life Sciences Vertical Division. As a Senior Consultant, I have had significant healthcare-related simulation modeling experience using both the ProModel and MedModel engines. I have significant experience modelling resident care and services and performing DES testing on the effects of different staffing levels on the delivery of care. More specifically, since 2012, I have worked with Dr. John Schnelle performing extensive DES testing of staffing and activities of daily living (ADLs) in nursing homes across the country. This DES testing and results served as the basis for a peer-reviewed journal article entitled, "Determining Nurse Aide Staffing Requirements to Provide Care Based on Resident Workload: A Discrete Event Simulation Model, JAMDA 17, 970-977 (2016) authored by Dr. Schnelle, myself, and others.

e. Healthcare Projects: For over 20 years, I have been either principally responsible or have had a significant role in ProModel/MedModel computer simulation projects across a wide range of industries and applications, but with an emphasis on the healthcare industry. Using and applying MedModel discrete event simulation (DES) computational software, I have tested the effects of various staffing levels on the delivery of numerous

types of care, treatment, and related services in many healthcare settings, including but not limited to:

i. 170 emergency departments nationwide for Hospital Corporation of America (HCA), located in 21 U.S. states;

ii. A large geriatric healthcare provider's nursing homes, assisted living facilities (with a dementia care unit), and a transitional care unit in Minnesota;

iii. Nursing homes across the United States, including facilities operated by various national chains;[4]

iv. Exempla Health operating rooms in Denver;

v. Baystate Health emergency rooms, call center, and primary care centers, across western Massachusetts;

vi. Caremark Pharmacy;

vii. Olympus Computational Equipment laboratories, operating worldwide with 92 group companies in 39 countries;

viii. Carillion Health specialty office, located in Roanoke, Virginia with facilities through Virginia;

ix. Fletcher Allen, now referred to as the University of Vermont Medical Center is located in Burlington, Vermont;

---

[4] I have significant experience modelling resident care and services and performing DES testing on the effects of different staffing levels on the delivery of that care. More specifically, since 2012, I have worked with Dr. Schnelle on this subject. To date, working in conjunction with Dr. Schnelle, we have performed extensive DES testing of staffing and activities of daily living (ADLs) in nursing homes across the country. This DES testing and results served as the basis for a peer-reviewed journal article entitled, "Determining Nurse Aide Staffing Requirements to Provide Care Based on Resident Workload: A Discrete Event Simulation Model, JAMDA 17, 970-977 (2016) authored by Dr. Schnelle, myself, and others.

x. GI Lab at Stanford University Hospital in Palo Alto, California;

xi. Oakwood Health emergency department in Columbus, Ohio;

xii. Evergreen Health emergency department;

xiii. Fort Bragg, Fort Eustis, and Fort Irwin in various clinical settings;

xiv. Middlesex, Connecticut hospital operating room;

xv. Washington Hospital Center's neurological specialty operating room;

xvi. St. Francis of CWH's perioperative unit;

xvii. Swedish Hospital's operating room suites in Seattle;

xviii. Basset Memorial surgery unit in New York; and

xix. Terumo Medical device manufacturing in Maryland.

27. **<u>Other ProModel Engineers Involved in the Brookdale Project</u>**: In addition to myself, 2 other ProModel/MedModel systems engineers, Dave Tucker and Bruce Gladwin, worked on this Brookdale project. Mr. Tucker and Mr. Gladwin have extensive experience in the use of DES staffing testing and failure analysis.

28. Mr. Tucker has served as the Director of Lean Six Sigma Initiatives & Senior Project Manager for ProModel/MedModel Corporation from October 2010 to the present.[5] In this capacity, Mr. Tucker has been responsible for the development and execution of Lean Six Sigma-based strategies and simulation projects to achieve corporate objectives for U.S. Government and healthcare, manufacturing and service

[5] From October 1999 to October 2010, Mr. Tucker worked for United Space Alliance (NASA Space Shuttle Project), Kennedy Space Center, Florida, in the following capacities: Lead Lean Six Sigma Master Black Belt (2010), Lean Six Sigma Master Black Belt for Logistics, Materials & Supply Chain (2007-2010), Lean Six Sigma Black Belt/Processing & Manufacturing Project Leader (2000-2007), and Technical Training Manager (1999-2000).

industries, including the Office of Secretary of Defense, U.S. Air Force, Boeing, U.S. Navy, BAE, NASA, United Space Alliance, St. Francis Hospital, Community Health Network Hospital Surgery Center, Orlando VA Medical Center, Varian, Ethicon, Pfizer, Merck, Sodexo, CSX, BlueScope Steel, Ingalls Shipbuilding, Commercial Metals Corporation, State of Nebraska, Huntsville Utilities, and many others. In addition to serving as Senior Project Manager, Mr. Tucker's job responsibilities include providing Discrete Event Simulation (DES) testing and failure analysis support to the ProModel Consulting Team in the following areas:

i. Simulation Model Project management and execution,

ii. Conducting training sessions on ProModel products and Lean Six Sigma training modules, and

iii. Subject Matter Expert on Lean Six Sigma methods.

29. For the past 18 years, Bruce Gladwin has been employed by ProModel as a systems engineer, project manager and senior consultant where he has been professionally responsible for the design, testing, and operation of systems engineering predictive analysis tools (DES) used in the healthcare, manufacturing, pharmaceutical, and service industries to mathematically determine the amount of labor and resources required to complete all work tasks, the tipping point at which workload exceeds the capacity of defined numbers of workers (staff) to complete all work task, and the amount of work that is possible (or impossible) given the workload and defined staffing levels or resources. Mr. Gladwin is a Certified Six Sigma Black Belt, having acquired this training and certification while employed as an internal simulation consultant for General Electric Power Systems Division in 2001-2003. He routinely uses Six Sigma Quality methods to perform simulation-based capacity and staffing analyses for ProModel customers.

30. Mr. Tucker and Mr. Gladwin assisted in quality assurance of the Brookdale DES testing and failure analysis. More specifically, they performed the standard, internal ProModel processes for quality assurance checking of models,

including verification and validation of the logic code, data inputs, model elements, structure, process operations, operations sequencing, process flow, and outputs to ensure reliability/accuracy of this Brookdale-specific DES testing and failure analysis. Further, as part of this quality assurance process, Mr. Tucker and Mr. Gladwin applied Lean Six Sigma methods to ensure reliability/accuracy of this Brookdale-specific DES testing and failure analysis.

IV. SUMMARY OF KEY FINDINGS

31. Extensive DES testing and failure analysis conducted by MedModel of 6 Brookdale facilities reveals:

a. The selected facilities were systemically and significantly understaffed (paragraphs 84-92 below),

b. On average, the selected facilities omitted 41.5% of the care time required to deliver resident care (paragraph 91 below), and

c. Brookdale's staffing methodology does not account for the actual distances and amount of time staff are required to travel within its facilities each day to deliver care, which on average requires 18.9% of the time in a work day (paragraph 90 below).

V. OVERVIEW: THE BASIS FOR MEDMODEL'S DES TESTING AND FAILURE ANALYSIS OF BROOKDALE FACILITIES

32. The DES testing, failure analysis, and opinions stated herein are based on the data and objectively verifiable facts that can be organized into 4 distinct domains of information:

a. Brookdale Facility-Specific Raw Data and Floor Plans (for the Selected Facilities),

b. Summaries of Voluminous Brookdale Facility-Specific Raw Data,

c. Brookdale Policy and Practice Documents, and

d. General Inputs and Programming Logic.

These domains are specifically described below.

VI. BROOKDALE FACILITY-SPECIFIC RAW DATA AND FLOOR PLANS

33. **Brookdale Facility-Specific Raw Data and Floor Plans (for 6 Selected California Facilities)**: I was provided Brookdale Facility-Specific Raw Data and Floor Plans for the below 6 Brookdale California facilities and their corresponding 3-year timeframes:

a. Irvine: 1/1/2017 to 12/31/2019,

b. North Euclid: 1/1/2017 to 12/31/2019,

c. Scotts Valley: 1/1/2017 to 12/31/2019,

d. Anaheim: 1/1/2017 to 12/31/2019,

e. Brookhurst: 1/1/2017 to 12/31/2019, and

f. Mirage Inn: 1/1/2017 to 12/31/2019.

The first 3 facilities listed only have Assisted Living units (no Memory Care Units). The last 3 facilities have both Assisted Living and Memory Care units.

34. This Brookdale Facility-Specific Raw Data included:

a. Raw Resident Assessment Data for the Selected Brookdale Facilities: The Brookdale raw *resident assessment* data for each resident at each of the 6 Brookdale California facilities and their corresponding 3-year timeframes is identified by facility and Bates number. *See* BKD1299857 though BKD1299846. This raw *resident assessment* data specifically details for each resident every line-item type of care or service determined by Brookdale to require assistance from Brookdale staff from the effective date of the assessment until the next assessment or a move-out or absence. [redacted]

b. Raw Resident Move-Out/Absence Data for the Selected Brookdale Facilities: It is my understanding that Plaintiffs in this case requested that Brookdale produce (a) the dates that any resident of a Brookdale California facility moved-out of a facility and (b) all dates that any resident was absent from a facility. For residents at each of the 6 Brookdale California facilities and their corresponding 3-year timeframes, I was provided raw data from Brookdale the specific dates when residents moved-out and were absent.[6] This raw move-out/absence from facility data is identified by facility and Bates number. *See* BKD1820457. *Per calendar day lists* of every line-item care service required by each resident in each facility can be created based on (a) either the date each resident moved-in or the effective date of the assessment

[6] As discussed below, it is my understanding that Brookdale has not produced complete move-out data for every resident who moved-out.

and (b) the date the resident moved-out and/or was absent from the facility. In essence, this data not only identifies which residents are "in the building" on each day of the 3-year timeframes but also identifies which assessment was active on each calendar day.

c. Raw Census Data for the Selected Brookdale Facilities: It is my understanding that Brookdale produced Labor Detail Reports that showed the daily total census (count of residents) in each of the 6 facilities. *See* BKD2874675 through BKD2874760_Confidential. [redacted] The total resident census per day at each of the 6 facilities, as well as the specific census levels on the assisted living unit and the memory care units, can be derived from a daily count of active resident assessments (based on move-in/move out data).

d. Raw Punch-Detail Staffing Data for the Selected Brookdale Facilities: The raw punch-detail daily *staffing* data, including time clock-based, punch-in/out details for every staff member (identified by a unique employee identification number) in these facilities is identified by facility and Bates number. *See* BKD1384958 through BKD1384975_Confidential. [redacted]

35. **Floor Plans**: Additionally, for each of the 6 Brookdale facilities, I was provided the floor plans produced by Brookdale, a simplified line drawing of same, and Google Earth measurements of each of the facilities. *See* Floor Plans/Measurements, MEDMODEL0003. Each facility floor plan was reduced to an accurate, to-scale simple line drawing using Adobe Illustrator, retaining the resident rooms, room numbers (when available), and key locations (such as dining rooms,

elevators, and stairs). Further, because the MedModel simulation allows the floor plan to be scaled to account for actual distances staff were required to travel in each building, overall facility dimensions were determined using the Google Earth measurement tool of aerial photographs of each facility. Based on my experience, measurements from Google Earth provide a valid means of determining distances within floor plans with reasonable accuracy. Within the MedModel software, the floor plan allows the actual distances that staff travel in a facility to be measured. Each facility's floor plan was inputted to the simulation through a defined path array in the source code. This path array or "path network" depicts the actual travel paths utilized by staff to travel from one room to another and to various locations within the facility. The shortest distance between two points is always utilized by staff, for purposes of the path array within the model. Because resident room numbers were not available within the raw resident assessment data produced, the DES model populates each floorplan with residents based on their AL or MC designation. Because resident room numbers were not available within the raw resident assessment data produced that would indicate whether rooms were shared or occupied individually, all residents are placed two to a room, with a balancing of residents on each floor, in order to create the most conservative placement possible in terms of staff travel distances and staff assignments. These floorplans and measurements constitute objectively verifiable inputs to the MedModel software.

VII. SUMMARIES OF VOLUMINOUS FACILITY-SPECIFIC RAW DATA FOR THE SELECTED BROOKDALE FACILITIES

36. **Summaries of Voluminous Facility-Specific Raw Data for the Selected Brookdale Facilities**: With respect to the voluminous raw data described above, I was provided per day summaries for each of the 6 facilities that included: (a) line-item listings of care services (per resident) which derived from the raw resident assessment data, (b) specific resident census data for each entire facility, as well as

census broken down by unit (*i.e.*, assisted living unit or memory care unit[7]), and (c) facility staffing hours calculated on an hours per resident per day and per shift basis (discussed below). These daily summaries contain the same kind of "*facility-specific data inputs*" that are generally used by ProModel/MedModel to conduct staffing analysis.

37. **<u>Summary of Daily Line-Item Care Services Per Resident</u>:** I was provided summaries containing the daily line-item care services that were required by each resident residing on the Assisted Living unit or, where applicable, the Memory Care unit. *See* Facility Inputs, MEDMODEL0004-9. Separate columns in these Facility Inputs—beginning in column AF and continuing to the columns to the right—include on a per resident basis the lists of all required care services on a given day, identified by a unique service code number.

38. It is my understanding that subject matter expert Dr. Flores reviewed the universe of raw assessment data that Brookdale produced for all residents in the 6 Brookdale facilities in order to identify each unique resident service task that requires staff time to perform. Each unique task was assigned a service code number. For example, residents in all 6 facilities who required toileting with physical assist by one person were assigned a service code number of [redacted] for this specific care, whereas residents requiring toileting with physical assist of 2 persons were assigned a service code number of [redacted]. In total, Dr. Flores determined there were 95 possible unique resident service tasks within the assessment data that Brookdale produced for the 6 facilities. Computer analysis was then performed of the universe of resident assessment data by Mr. Blake Peters, Data Analytics, to (1) determine each unique line-item service required by each resident, (2) verify that these 95 unique identified services capture 100% of all care required by the resident populations in the 6

[7] Brookdale uses the term Memory Care (MC) to refer to the distinct section of the facility housing and providing care to memory care residents.

facilities. This voluminous assessment data was compiled and summarized by Mr. Peters for each of the 6 facilities on a per resident per day basis.

39. More specifically, as part of the *Facility-Specific* Data Inputs described above, Mr. Peters applied this set of 95 possible service codes to each resident assessment and created daily line-item listings of every service (by service code) required by every resident at each of the 6 Brookdale facilities throughout their 3-year timeframes. The per day list of unique service code numbers required by each resident functions as an objectively verifiable, machine-readable proxy to the actual care requirements listed in each of the resident's assessment. These daily listings of care needs by service code allow MedModel to look-up information about each task to be performed for each resident in each room, schedule each task to occur during the day, assign it to be performed by the correct primary care provider, and identify how much time is required to perform it. In this manner, the line-item listing of service codes work together with the Service Code Key information to drive the activities of staff over the floorplan and over time within the model.

40. **Summary of Daily Resident Census:** I was provided the daily census for the AL units and, where applicable, the daily census for the MC units based on the active resident assessments for each of the 6 facilities. *See* Facility Inputs, MEDMODEL0004-9, column F (AL census) and column S (MC census).

41. As previously noted, the [redacted] The total census, as well as the per unit census, can be independently determined from the Brookdale active resident assessment data and move-out/absence data. A comparison, however, of the daily census numbers from these 2 sources revealed the per day total census did not always match. Many of the daily total census numbers obtained from the Brookdale Labor Detail Reports are inconsistent with and conflict with the daily total census numbers derived from the Brookdale active resident assessments and move-out/absence dates. As a result, on

certain days, a significant number of resident assessments were missing, resulting in a reduction in workload (*i.e.*, a reduction in the line-item care services required to be performed by staff).[8]

42. MedModel conducted "best case"[9] DES testing and failure analysis for days when complete or substantially complete data was produced by Brookdale. Complete or substantially complete data was defined to include specific days where (1) the census numbers from these Labor Detail Reports matched the census numbers derived from active resident assessments or (2) where a comparison of the census numbers derived from active resident assessments and the census in the Labor Detail reports show that from *1 to 5 resident assessments were missing* on these days.[10] Specific days where more than 5 assessments were missing or where the census derived from active resident assessments exceeded the census from the Labor Detail Reports were excluded from the "best case" DES testing and failure analysis. *See* Flores Declaration, specifically the subsection entitled "Daily Counts of Line-Item Services Where Census Levels Based on Assessments and Labor Detail Variance Data Do Not Match," paragraphs 41 through 44 and included Tables 1 and 2.

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[8] Also, a comparison of the census reported in the Labor Detail Reports and the census derived from active resident assessments revealed that on certain days the number of active assessments exceeded the census reported in the Labor Detail Reports. *See* Flores Declaration, paragraphs 41 through 44.

[9] "Best case" analysis is defined below and includes the most care possible based on a combination of critical factors impacting the delivery of care—*see* paragraphs 82-83 below.

[10] The effect of missing 1 to 5 resident assessments on any day analyzed is that the workload is reduced, the line-item care services count is reduced, and the required hours of staff time needed to deliver line-item services is reduced. Accordingly, on days where resident assessments are missing, MedModel's DES testing and analysis is conservative.

43. **<u>Summary of the Hours of Brookdale Staffing Per Day and Shift</u>:** Further, I was provided summaries of the Brookdale staffing hours, calculated on a per patient day[11] (and per-shift) basis for designated "caregiver" staff. The summaries of daily and per shift *caregiver* staffing hours per patient are contained in Facility Inputs, MEDMODEL0004-9, columns G though R (AL Unit) and columns T through AE (MC unit). More specifically, these per patient day staffing summaries were computed by:

a. Compiling and calculating the to-the-minute hours of staff time (as documented in the raw Brookdale punch detail staffing records) for each day and work shift during the 3 year period for each facility and

b. Dividing the total hours of staff time per shift by the corresponding census count (the number of residents) on each day and every shift during the 3-year period for each facility.[12]

44. The above computations result in a staffing measurement known as hours per patient per day and per shift (HrsPPD and HrsPPS). Hours per patient per day (and per shift) is a staffing measurement widely-used across the healthcare industry to understand the average amount of staff resources/time that are allotted on a per resident basis. This measurement shows how much staff time on average is available to deliver care and services to each resident.

45. **<u>Caregiver Hours Per Patient Day</u>:** It is my understanding that the line-item care services documented in resident assessments are delivered by 4 types of

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[11] The terms per patient day and per resident day are used interchangeably within this Declaration and are intended to have the same meaning.

[12] For example, if there are 125 total hours of Care Manager time for the day, evening, and night shifts on January 2, 2018, and 100 residents on that day, the HrsPPD would be 1.25 (125 hours divided by 100 residents = 1.25 HrsPPD).

Brookdale staff: (1) Care Managers,[13] (2) Medtechs,[14] (3) LPNs,[15] and (4) Care Directors (Supervisors).[16] The staffing hours per patient per shift worked by every variety of these 4 types of staff are summarized in the Facility Inputs, MEDMODEL0004-9, columns G though R (AL Unit) and columns T through AE (MC unit).

46. My understanding that the above 4 defined types of staff deliver the line-item care services documented in resident assessments is based on subject matter expert Dr. Flores's input, including her review of the Labor Detail Report's designation of the clinical department staff and Brookdale job descriptions. To the extent that Brookdale provides evidence that other job titles provided assistance with the line-items care services and can quantify the number of hours of assistance provided by "non-clinical" or other staff, MedModel can test and analyze the impact of any such additional staffing on the delivery of line-item care.

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13 [redacted]

14 [redacted]

15 [redacted]

16 [redacted]

47. **<u>Quality Assurance Review of All Summaries of Voluminous Records</u>:** The summaries of voluminous raw data described within this section were compiled under the direction of Dr. Flores and provided to MedModel by Mr. Peters, Data Analytics. I have worked with Dr. Flores and Mr. Peters on several projects. As in prior projects, MedModel provided instructions to Mr. Peters with respect to the analysis of the raw Brookdale data and the specific formatting of the summarized data—all of which were followed in this case. The summary data provided by Mr. Peters is of the kind and type of data that ProModel/MedModel regularly uses and relies upon to conduct DES staff testing and failure analysis. MedModel has been provided this same type of data from Mr. Peters in the past and has found it to be reliable and accurate. Based on my prior work with Mr. Peters in this and other cases, I know that he has the required expertise, training, education, and tools necessary to create accurate summaries of voluminous data using standard SAS programming.

48. I further understand that Mr. Peters has performed standard internal database checks to ensure that the above-described summaries of voluminous raw data are accurate and reliable. I have also reviewed, tested, and confirmed that these summaries are accurate and reliable. These summaries serve as an objectively verifiable basis for my findings and opinions contained in this Declaration.

VIII. <u>BROOKDALE POLICY AND PRACTICE DOCUMENTS</u>

49. **<u>Brookdale Policy and Practice Documents</u>**: I was provided Brookdale policy and practice documents that include:

a. Brookdale's Personal Service Assessment and Personal Service Plan Interpretive Guidelines, dated July 2018, [redacted] (BKD0005133-5158);

b. Brookdale's "Using the Personal Service System (PSS) Online—Quick Reference Guide" (BKD0005118-5131);

c. Sample of completed Brookdale PSA/PSP Q&A Assessment form (used for prospective assisted living residents) that lists the services to be provided to residents for a fee (BKD1152669);

d. Brookdale Acuity Minutes Norms spreadsheet (including both AL and MC information), [redacted] (BKD2874663);

e. Brookdale Clinical Time Studies spreadsheets [redacted] (BKD2886744 and BKD2886745);

f. Brookdale's "Deep Dive Follow-Up Review of Current RSW[17] Time Standards" document dated October 18, 2011, [redacted] (BKD2882807); and

g. Brookdale's community-specific spreadsheets that show how [redacted] that generally result in less staff time being available to provide line-item services (BKD2874670 though BKD2874674).

IX. GENERAL INPUTS AND PROGRAMMING LOGIC

50. As generally described in my prior Declaration, in addition to the above-described facility-specific data needed, MedModel requires general inputs and

[17] According to this Brookdale Deep Dive Follow-Up document, [redacted]

programming logic to perform DES testing and failures analysis.[18] The function of each of these general inputs and programming logic within the model is described below.

51. **Task Time Data for Each Care Service Task**: For purposes of the DES testing conducted in this case, MedModel used the task times set forth in Global Expert Inputs, MEDMODEL0010, Input Key for Assessed Services tab, columns G and H—AL Task Times and MC Task Times. These task times were provided by subject matter expert Dr. Flores (*see* Flores Declaration, paragraphs 49-52). It is my understanding that Dr. Flores used Brookdale's own task time information whenever available which derived from (1) [redacted] (BKD2874663) and (2) [redacted] (BKD2886744 and BKD2886745). To the extent that no task time data was defined by [redacted] for a line-item service, it is my understanding that Dr. Flores provided a reasonable task time for such line-item services based on: (a) the task times used by other California ALF chains, (b) peer-reviewed literature, and (c) Dr. Flores' experience and expert opinion as to what constituted a reasonable task time for the particular care service.

52. **Triangular Task Time Distributions:** Rarely in the real world does a care task require precisely the same amount of time to perform. System engineers understand that task time variation must be accounted for in analyzing staff sufficiency in any work system. Rather than using a single average task time for each task, system engineers commonly use generally-accepted triangular probability distributions to account for and test the impact of task time variation. A triangular

[18] The general inputs and logic discussed in this section are the same kind of general inputs and logic used by ProModel/MedModel to test workload and staffing in the U.S. military, leading manufacturing and service companies, and healthcare institutions across the country.

distribution provides a continuous probability distribution for a range of data points (in this case task time values).

53. Within the field of systems engineering and DES testing, triangular distributions are a standard and commonly-used distribution expression to test the impact of task time variation and to represent task time probability distributions that must be estimated due to data unavailability.[19] A triangular distribution consists of 3 parameters: the minimum, mode, and maximum values of a data set. For example, T(5, 10, 15) where 5 is the minimum, 10 is the mode, and 15 is the maximum value in a data set. In the case of task times, the minimum and maximum parameters represent the range over which the task time varies with the most often occurring task time value being the mode. When each of these data points are plotted, the shape of the triangular distribution curve is defined by a minimum value along with its probability, a maximum value, along with its probability, and a mode value (*i.e.*, the most often occurring value), along with its probability.

54. In the case of Brookdale, a series of triangular probability distributions (containing different minimum, mode, and maximum time values)[20] were used to test the impact of task time variation on the delivery of care services.[21] MedModel's built-in random number generator and distribution fitting algorithms are used to randomly select a value within these triangular distributions, based on the minimum, mode, and

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[19] *See*: A. M. Law (2007), *Simulation Modeling and Analysis, Fourth Edition*, McGraw Hill, p. 300; Jerry Banks, et al. (2010), *Discrete-Event System Simulation, Fifth Edition*, Prentice Hall, p. 183; and Charles Harrell, et al. (2004), *Simulation using ProModel, Third edition*, McGraw Hill, p. 140.

[20] The minimum, mode, and max times were calculated from Brookdale's own task times when the same were available and, when not available, from task times (a) used by other California ALF chains, (b) found in peer-reviewed literature, and (c) determined to be reasonable by Dr. Flores, in accordance with accepted industrial engineering practices.

[21] *See* Table of DES Testing, MEDMODEL0011, column J.

maximum time values in order to produce scientifically valid and reasonable task time variation.[22] The task times and triangular distributions derived for and used in the Brookdale DES testing and failure analysis are valid, reasonable, and consistent with modeling guidelines (found in almost any simulation modeling textbook), general Lean Six Sigma principles, and statistical guidelines. Further, the method by which MedModel created triangular task time distributions for the Brookdale case is the same method that ProModel/MedModel uses to create triangular task time distributions for the U.S. military, leading manufacturing and service companies, and healthcare institutions across the country.[23]

55. **Task Frequency Data for Each Care Service Task**: In order to determine the total number of each type of line-item service required on a per day basis, the per day frequency of each task must be defined. For example, since meals occur 3 times a day, residents who are assessed as needing feeding assistance receive this assistance 3 times a day (breakfast, lunch, and dinner). The frequency of each line-item care task is based on Brookdale resident assessments, Watermark care task frequencies, industry data obtained from other ALF chains operating in California, authoritative literature, and subject matter expert Dr. Flores' review of this frequency data for reasonableness. *See* Global Expert Input spreadsheet, MEDMODEL0010, Input Key for Assessed Services tab, columns K and L.

56. **Non-Direct Care/Administrative Staff Activities that Reduce Staff Time to Deliver Line-Item Services**: Staff in every healthcare facility, including Brookdale facilities, must perform certain activities that reduce available time for providing direct care services to residents. For example, staff do not provide direct

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[22] *See* discussion of MedModel random number generator and test replications below.

[23] Further, it is a common and acceptable practice in simulation modeling to increase or decrease the parameters (minimum and maximum range) of a triangular distribution when running scenarios to test the impacts of changes to those expressions, as was done in this case.

care to residents while taking meal breaks or paid breaks. Consequently, staff who work a full 8-hour shift do not have a full 8 hours to deliver care. The Brookdale staff activities that reduce available time for delivery of the line-item assessed care services include: (1) meals breaks, (2) paid 10-minute breaks, (3) change of shift reports, (4) customer service requests (*i.e.*, responding to pendant request), (5) incident/accident/emergency response and reports, (6) controlled substance counts, and (7) medication administration record audits (collectively referred to as non-direct care/administrative staff activities). The Brookdale DES testing and failure analysis schedules these non-direct care/administrative staff activities and reduces the amount of time available to staff (to deliver line-item care services) accordingly. The 7 non-direct care/administrative activities, their task times, their frequencies, and the job type/discipline who performs each of them are based upon Brookdale's Clinical Time Studies (BKD2886744), other ALF industry data, California Labor Code related to paid 10-minute breaks, and subject matter expert Dr. Flores' determination of reasonable frequencies. *See* Global Expert Input spreadsheet, MEDMODEL0010, Inputs re Staff Availability tab, which includes a list of the non-direct care/administrative staff activities and sources.

57. **<u>Schedules of Care Services and Non-Direct Care/Administrative Staff Activities</u>:** As to both the 95 possible line-item resident care service tasks and the 7 non-direct care/administrative staff activities, subject matter expert Dr. Flores provided MedModel with *initial* schedules listing on what days and what time each task should reasonably occur. Dr. Flores' schedules for line-item care service and non-direct care/administrative staff activities were *initially* used in MedModel's testing and analysis for purposes of determining the order in which and the specific time(s) that these services were to occur each day. As part of the comprehensive DES testing and analysis conducted, MedModel subsequently *determined the most efficient schedules* (*i.e.*, the schedules that allowed the most work to be done), by modifying Dr. Flores's initial schedules and randomly increasing and /or decreasing

the specific time each task was scheduled to occur (by up to +/- 2 hours for line-item care services and up to +/- 1 hour for the non-direct care/administrative staff activities). In other words, MedModel tested and determined the line-item care service and non-direct care/administrative staff activities schedules that allowed the most work to be accomplished. These schedules that allowed the most resident care service tasks and non-direct care/administrative staff activities to be performed were used in the "best case" scenarios. *See* Table of DES Testing, MEDMODEL011, Test Series 14C and 16Q for "best case" schedules.

58. **Bundling of Services**: Certain care services can be grouped together and provided sequentially or simultaneously to a resident or residents. When this occurs, these services are considered to be "bundled." Subject matter expert Dr. Flores provided me with instructions as to which care services should be bundled and how, either through time reductions, removal, or pairing of tasks. This bundling information is included within Global Expert Input spreadsheet, MEDMODEL0010, Input Key for Assessed Services tab, column F.

59. **Behavioral Interventions**: According to the assessment data, certain Brookdale residents exhibited behaviors requiring staff intervention. The service code key allows MedModel to determine which residents require these behavioral interventions. Subject matter expert Dr. Flores provided MedModel with instructions as to how the line-item behavioral interventions by staff should occur within the logic of the DES analysis (randomly and paired with ADL care). This behavioral intervention information is included within Global Expert Input spreadsheet, MEDMODEL0010, Input Key for Assessed Services tab, column I; and Staff Codes tab, columns C and D. In order to examine the effect of behavioral interventions on the delivery of care, as part of the MedModel DES testing, these behavioral

interventions were tested (1) at scheduled (non-random) times, (2) deleted entirely from the testing, and (3) in accordance with Dr. Flores' instructions.[24]

60. **Priorities of Care**: Within the MedModel software, each task is given a simple "priority" ranking. In simple terms, the priority dictates which task should be done first when a staff member is confronted with 2 different tasks at the same time (*i.e.* which task has "priority"). Subject matter expert Dr. Flores provided priority inputs which were used in the MedModel analysis. *See* Global Expert Input spreadsheet, MEDMODEL0010, column AI of Input Key for Assessed Services tab, and column S of Inputs re Staff Availability tab. Feeding assistance, toileting assistance, and medication tasks were all given higher priority than the other line-item service tasks. In order to examine the effect of care priorities on the delivery of care, as part of the MedModel DES testing, the care priorities were changed and the impact analyzed.[25]

61. **Care Windows**: A care window is the time frame in which a care service or non-direct care/administrative staff activity is required to be performed within the DES testing and failure analysis. If the task is not performed within the care window, it is deemed to be omitted. When a resident has to wait for care or service for so long that the delay exceeds the acceptable "care window," that task is deemed to be omitted. For example, if breakfast is scheduled for 8:00 a.m. but not provided before 2:00 p.m., the care window has been exceeded and the task is counted by the model as omitted. Subject matter expert Dr. Flores defined these care windows. *See* Global Expert Input spreadsheet, MEDMODEL0010, column AH of Input Key for Assessed Services tab and column R of Inputs re Staff Availability tab. It is my understanding that each of these care windows are based on Dr. Flores' experience and knowledge

[24] *See* Table of DES Testing, MEDMODEL0011, Test Series 3C and 15A.

[25] *See* Table of DES Testing, MEDMODEL0011,Test Series 9A through 9F.

of what constitutes a reasonable and acceptable window of time to deliver the identified care service.[26]

62. **Staff Travel Speed**: The MedModel computational analysis of Brookdale' staffing uses a travel speed for all staff members of 264 feet per minute.[27] As previously discussed, the actual distances that staff must travel in order to deliver line-item care services or perform non-direct care/administrative staff activities are a function of the facility floorplan's measurements, the location of residents, and the places in the building where staff and/or residents must travel (*e.g.*, the dining room).[28] This travel speed accounts for burdened and unburdened travel by staff throughout the day within the building. Burdened travel means a staff member is escorting or transporting a resident (pushing resident in wheelchair or assisting an unsteady resident with walking), pushing a supply cart, or transporting equipment (Hoyer lift). As part of the DES testing conducted in this case, MedModel analyzed numerous staff travel speeds and the impact these different travel speeds had on the amount of care that could be delivered.[29] This input of the model is included in the Global Expert Input spreadsheet, MEDMODEL0010, Scenario Parameters tab, line 3.

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[26] As part of the MedModel DES analysis conducted in this case, the impact of the care windows (provided by Dr. Flores) on the amount of care that could be delivered by Brookdale's staff were tested by increasing or decreasing them. *See* Table of DES Testing, MEDMODEL0010, Test Series 9E, 9F, 13A through 13H.

[27] Note that a slower travel speed of 175 feet per minute is supported by human factors research. *See* ISO 11228-1-2003(E) (referring to .5 m/s to 1 m/s [98 fpm to 197 fpm]).

[28] Because the assessment data did not provide room numbers for each resident, in order to reduce the travel distances and the amount of staff travel time, 2 residents were placed per resident room within the floorplans analyzed. As a consequence, both the staff travel distances and the amount of staff travel time calculated by the MedModel DES testing and analysis are conservative.

[29] *See* Table of DES Testing, MEDMODEL0011,Test Series 7A through 7D.

63. **<u>Built-in MedModel Random Number Generator</u>:** The MedModel DES computational software includes a built-in random number generator that is used to test the effect that variation in general inputs has on care delivery. More specifically, the random number generator is used: (1) to randomly generate specific time values defined by the triangular task time distributions and distribution probabilities, (2) to randomly schedule occurrences of behavioral interventions, (3) to randomly determine which care service is performed first when 2 residents require the same care service at the same time, and (4) to randomly select the order in which resident care begins first which impacts travel.

64. The use of a random number generator to create variability is a standard, well-accepted methodology within the field of system engineering and industrial modelling used to replicate real-world variability and to quantify its consequences. Unlike a simple calculator, MedModel DES testing is performed multiple times for every scenario in order (1) to generate a range of results caused by variability, (2) to measure how much the results differ for multiple tests performed on a single scenario, and (3) to scientifically determine the average effect of the variation (*i.e.*, average result). These multiple tests performed on a single scenario are called "replications."

65. The random number generator logic used in the Brookdale case allowed MedModel to perform thousands of tests of various work scenarios to quantify the impact of the variability described above on the capacity of staff to deliver care. More specifically, as described below, MedModel performed 50 test replications per day for each work scenario for each of the 6 Brookdale facilities. These replications allowed MedModel to examine the effects of variation and were part of the steps taken to ensure that the DES model was properly calibrated and functioning correctly.

X. VALIDATION AND CALIBRATION OF MEDMODEL DES TESTING AND FAILURE ANALYSIS OF BROOKDALE FACILITIES

66. **Validation**: The MedModel ALF staffing DES performed in this case has undergone a significant amount of back validation, testing, and calibration. Numerous validation techniques were utilized, including internal validity checks, facial validity checks, extreme condition checks, parameter variability-sensitivity analysis, animation checks, trace techniques, and comparison to other models. Importantly, the DES for each of the 6 Brookdale facilities has been tested to ensure internally consistency/internal validity. For example, increasing or decreasing the census or the workload in the models for the 6 Brookdale facilities results in omitted care increasing or decreasing appropriately and as expected in response to these changes. Model runs were visually observed and checked to determine if anything appeared out of sequence or incorrect in how the model functioned. Further, MedModel traced the detailed resident activity and staff activity logs created as part of the DES analysis of the 6 Brookdale facilities. These resident activity and staff activity logs document every activity occurring within the model and when specifically they occur. The review of these logs confirmed that the simulation faithfully reproduced and accurately modelled the operation of these facilities based on the inputs I received.

67. **Controlled Test Simulations to Confirm Proper Calibration and Proper Working Order**: The simulations for the selected Brookdale facilities have been run with a variety of combinations of census, workload and staffing PPDs to test and ensure that they were properly calibrated and functioning correctly. Additionally, the resident and staff activity logs were analyzed in conjunction with the results and statistics to ensure that the simulation was operating correctly. All inputs were verified and correct. This review confirmed the proper calibration and

functioning of the simulation. Further, we confirmed that the computer on which the simulation was run was functioning normally.

68. **<u>Simulation Warm-up, Run Period, and Replications</u>**: Three parameters control the number of times that the simulation runs for a given set of inputs: the Warm-up Period, the Run Period, and the Replications (*see* random number generator discussion above).

a. The Warm-up Period is the number of days the simulation is run from a cold start with all of the simulation queues being empty to realistic operating conditions with stabilized output. Realistic conditions include tasks that are scheduled for third shift, but carry over to the following first shift.

b. The Run Period is the number of days the simulation runs and tracks data after the Warm-up Period. For the Brookdale ALF analyses, the run period was set to daily.

c. The number of replications run is designed to account for random variations that occur from one replication to another (*see* random number generator discussion above). As to MedModel DES testing and failure analysis of the 6 selected Brookdale facilities, 50 test replications were performed for each Test Scenario per day to ensure reliable results and proper functioning.

69. **<u>Quality Assurance Process</u>**: I and members of ProModel's engineering team (Mr. Tucker and Mr. Gladwin) have performed the standard, internal ProModel processes for quality assurance checking of models, including verification and validation of the logic code, data inputs, model elements, structure, process operations, operations sequencing, process flow, and outputs to ensure reliability/accuracy of this Brookdale-specific DES testing and failure analysis. Further, as part of this quality assurance process, we applied Lean Six Sigma methods to ensure reliability/accuracy of this Brookdale-specific DES testing and failure analysis.

70. **Proper Storage of Simulation Data**: All DES inputs are properly stored so as to remain accurate, complete, and available for review. Further, when DES testing occurs, MedModel automatically and properly generates and stores a variety of statistical data.

71. **Software**: The DES testing and failure analysis performed in this case used the commercially available MedModel software. This simulation engine and software has been used since 2000 on thousands of different healthcare projects and has (1) performed properly and accurately and (2) its results have been generally accepted in the field of engineering and routinely relied upon by systems engineers and simulation engineers.

72. **Proper Functioning and Competency**: The DES testing in this case has been performed on computers and virtual computers in the cloud capable of running MedModel correctly. The computers on which this DES testing has been run were inspected and confirmed to meet or exceed the required minimum specifications of the MedModel program. I confirmed that the computers worked properly before, during, and after the testing was performed. The DES analysis at issue was performed by personnel within MedModel, all of whom are competent and qualified to operate the computer and to run the DES testing. All DES testing was performed by competent individuals under the supervision of MedModel.

73. **Error Rate**: As the logic of a staffing-based DES is simpler than other types of computer simulations, the known error rate for the MedModel platform is significantly reduced and statistically insignificant. The known error rate for the MedModel engine is statistically insignificant and on the order of 1 in 10 to the 59^{th} power. The random number generator used by MedModel has been tested and reliably produces a random number for the DES testing.

74. **General Acceptance Within the Scientific Community:** The ProModel/MedModel engineering analytic tool and computational software (DES) that was used for purposes of analyzing Brookdale's workload and staffing in this

case is taught in engineering schools throughout the country and is used and relied upon by the U.S. military, manufacturing and service industries, and healthcare institutions across the United States to test and determine if (a) it is mathematically and physically possible for the number of workers scheduled on a job to handle the assigned workload (i.e. complete every task required to be performed) and (b) what quantity of work can and cannot be performed when different numbers of workers (or resources) are allocated to a job.

75. The ProModel/MedModel engineering analytic tool and computational software used in this case is generally-accepted by the scientific and professional community as a reliable tool for testing and determining (1) capacity of a defined number of staff (the workforce) to meet the demands imposed by the work system and (2) the percent of services that are physically possible or impossible (*i.e.*, failed or omitted). Like the ProModel/MedModel DES testing and analysis conducted for the military, manufacturing and service industries, and healthcare institutions described above and in my prior Declaration, the DES testing of the Brookdale facilities is grounded in the same methods and procedures of science, industrial engineering, and mathematics, and it has been subjected to the same intellectual rigor, scientific methodology, Lean Six Sigma principles, and engineering principles.

XI. MEDMODEL DES TESTING AND FAILURE ANALYSIS OF BROOKDALE FACILITIES

76. **Overview of Brookdale DES Testing and Results**: To date, a total of ***over 1.3 million MedModel DES tests and failure analyses have been performed*** related to the 6 Brookdale California facilities (an average of over 210,000 engineering tests per facility) for those days during the 3-year timeframe for which Brookdale produced complete or substantially complete data. These tests and the results are set forth in the Table of DES Testing, MEDMODEL0011. These tests and results conclusively establish that the subject Brookdale facilities are systemically understaffed due to the common failure by each facility to provide sufficient numbers

of staff to deliver the care documented as being needed by residents in their resident assessments.

77. MedModel's comprehensive testing and failure analysis of the 6 Brookdale California facilities' workload (line-item services required by the residents on a daily basis) and staffing (the corresponding daily staffing levels) revealed a pattern and practice of significant understaffing at each of the tested facilities. More specifically, the number of hours required to perform the daily line-item services at each facility (workload) exceeded the number of staffing hours available on a daily basis, resulting in an average daily staffing shortfall of 41.5% per facility (*see* discussion of test results below). As a consequence of the staffing shortfall, the residents of the 6 selected Brookdale facilities were placed at a substantial and ongoing risk for not receiving required services.

78. **<u>Table of DES Testing and Layout</u>**: The Table of DES Testing (MEDMODEL0011) details and summarizes the comprehensive-engineering testing, inputs, and results of these over 1.3 million tests, organized into 117 unique Test Series (rows of data). Each of these 117 unique Test Series consist *at least 7,200* total tests for the 6 facilities combined. Each row of the Table represents a single Test Series (column B), with the general description and critical factor being tested as identified below (columns F through U). Column E of the Table describes the total number of DES tests performed for each Test Series based on the number of days tested (*i.e.* daily scenarios found in column C) and based on the number of tests per daily scenario (*i.e.* replications[30] in column D).

79. The results of the DES testing and failures analysis are reported in the Table of DES Testing (MEDMODEL0011) for each of the 6 Brookdale facilities in columns AD through AI, entitled "AVERAGE Omitted Care Time %." Average

[30] Replications and the random number generator are discussed above in General Inputs.

Omitted Care Time Percent is calculated by dividing the number of hours of omitted care time *by* the average total staff time *required* per day. For example, assume 100 residents in a facility require 17,000 minutes of total staff time for their care on November 1. If staff could only deliver 12,000 minutes of this care, then 5,000 minutes would be the omitted care time shortfall. The omitted care time percent would equal 29% (5,000/17,000 = 29%). This omitted care time percent represents mathematically and physically impossible/omitted care.

80. The results reported in columns AC through AH of the Table of DES Testing (MEDMODEL0011) were calculated by averaging the results of 50 tests performed on a per day basis. For example, the results in cell AD98 (*i.e.*, column AD, row 98) for Brookhurst derive from the average results from the 50 tests performed for each of the 24 days tested—a total of 1,200 tests.[31]

81. These test results set forth in Table DES Testing (MEDMODEL0011) show that each of the 6 Brookdale facilities failed every one of the tests performed to determine if the facilities had enough staff to provide the care documented as required in resident assessments.

82. **Nature and Purpose of DES Testing Conducted in This Case**: As part of the comprehensive engineering testing and failure analysis conducted in this case, MedModel tested every critical factor that impacts the amount of staffing required and the amount of care that can be delivered by a set number of staff.[32] The

[31] For sake of organizational completeness, the specific filenames of the various inputs used by the DES testing of these Brookdale facilities and the outputs/results are listed in columns V through AA (MEDMODEL0011).

[32] For Test Series 1 through 17, MedModel initially tested and analyzed the 6 Brookdale facilities using active assessment and staffing data for the 1st and 15th of each month for a one-year period (24 days) per facility. This initial testing was conducted as part of MedModel's determination of the best case/most care scenario. The year selected for this initial testing (from which data was pulled for the 1st and 15th of each month) was the year at each facility where the average census numbers based on active resident assessments most closely matched the census from Labor

critical factors tested in this case are the same standard kinds of variables and inputs used and tested by MedModel across the healthcare industry (including hospitals, clinics, nursing homes, and assisted living facilities) to determine sufficiency of staffing. More specifically, in the more than 1.3 million tests, MedModel examined how the following critical factors impacted the amount of staffing required and the amount of care that was physically possible[33]:

a. Task Times (testing the impact of how much staff time is required to perform each different care task—see discussion above in General Inputs),

b. Bundling of Care Services (testing the impact of performing certain care tasks together for a time savings—see discussion above in General Inputs),

c. Randomization of Behaviors (testing the impact of when behavioral care interventions occur randomly),

d. Triangular Distributions-Task Times (testing the impact of task time variation in accordance with industrial engineering principles—see discussion above in General Inputs),

e. Crossover and Sharing of Staff Between Units (testing the impact of having staff from the assisted living and memory care units work on both units within the model),[34]

Detail Reports. The "best case" testing for all days during the *3-year timeframe* where data produced by Brookdale was complete or substantially complete is discussed below.

[33] Each of these listed critical factors is listed separately in the Table of DES Testing (MEDMODEL0011) in columns G through U.

[34] All DES testing and failure analysis conducted in this case allowed certain staff to "drop-down" and perform care assigned to another. For example, if a Medtech has time available, the model logic allows that Medtech to drop down to perform Care Manager tasks. Likewise, LPNs and Care Directors (Supervisors) can drop down and perform Med Tech or Care Manager tasks (if they have available time).

f. Two Person Assists (testing the time impact of 2 staff members being required to perform a given care task),

g. Travel Speed and Travel Time (testing the impact of travel distances and how fast staff members travel between locations in the facility to deliver care),

h. Stair and Elevator Travel Time (testing the impact of how fast staff members travel between floors in the facility to deliver care),

i. Care Priorities (testing the impact of how care activities are prioritized),

j. Care Windows (testing the impact of how long staff has to perform a care service before it is considered omitted),

k. Staff Productivity (testing the impact of how staff productivity impacts the amount of care that can be delivered),

l. Staff Type Responsible for Care Service (Job Titles) (testing the impact of certain staff—*i.e.*, one job title—being assigned responsibility for all care services),

m. Amount of Staff (HrsPPD) (testing how increasing and decreasing the amount of staff impacts care delivery),

n. Scheduling of Non-Direct Care/Administrative Staff Activities performed by Staff (testing the impact of different schedules of non-direct care/administrative staff activities), and

o. Resident Care Service Scheduling (testing the impact of different schedules of line-item care services).

83. **<u>Selection of Best-Case/Most-Care Scenario</u>:** This extensive and methodical testing of these critical factors allowed MedModel to determine the impact of each factor and combinations of factors on the amount of care that was physically possible. Importantly, the results related to these critical factors allowed MedModel to determine the "best case" scenario at each of these 6 Brookdale

facilities, given their daily staffing and workload levels determined from Brookdale's records. The "best case" scenario represents the combination of *realistic* critical factors that allow Brookdale staff to provide the *most care* services to residents.[35] The "best case" scenario was tested for days when complete or substantially complete data was produced by Brookdale during the 3-year timeframe for each of the 6 selected Brookdale facilities. These final "best case" results set forth in Table of DES Testing (MEDMODEL0011) are scientifically reliable, conform to accepted engineering principles, and are accurate.

84. **Results of DES Testing and Failure Analysis for Best-Case /Most-Care Scenarios:** The final "best case" findings for each of the 6 Brookdale California facilities are depicted in the line graphs below (Tables 1-6), as well as the summaries found in Tables 7-10.[36]

85. Each of the line graphs depicted in Tables 1-6 below show:

a. The total number of hours required to deliver the care services documented in resident assessments per day on the days where Brookdale produced complete or substantially complete data over the 3-year period (**black line**) and

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[35] A number of the DES tests involved unrealistic inputs, described in column AC of the Table of DES Testing (MEDMODEL0011). For example, MedModel tested what happened (a) if Brookdale staff travelled at *unrealistic* speeds of 28 MPH—the speed of Usain Bolt's top speed and (b) if each care service for Brookdale residents *unrealistically* required only 1 minute to perform (*e.g.*, only 1 minute to bathe a resident, only 1 minute to toilet a resident, etc.). *See* Table of DES Testing, MEDMODEL0011, Test Series 7D and 1B and *see* column AB for description. The results of such *unrealistic* tests provide MedModel system engineers with information regarding the model's integrity when extreme input values are tested, as well as insight as to what factors are constraining the capacity of the work system.

[36] *See* the complete DES test results, including the "best case" results, for each of the 6 Brookdale facilities, MEDMODEL0012 through MEDMODEL0017.

b. The total number of hours of available care time for Care Managers, Medtechs, LPNs, and Care Directors[37], after meal breaks, paid breaks, travel time, and non-direct care/administrative staff activities are deducted/performed, on the corresponding days where Brookdale produced complete or substantially complete data over the 3-year period (**red line**).

86. The vertical y-axis of the graphs measures the number of hours, and the horizontal x-axis displays monthly intervals during the years in which complete or substantially complete data was produced. Each specific data point represented in the black line and the red line (including its date) derives from the Best Case Results, MEDMODEL0012 through MEDMODEL0017 and is presented in Gap Chart and Table Data, MEDMODEL0018. A gap between the required hours (black line) and the available care hours (red line) indicates that a facility failed to provide sufficient numbers of available staff hours to meet the documented needs of residents.[38] The difference between the black line and the red line values (*i.e.*, the size of the gap) shows the degree to which it was mathematically and physically impossible for each of the 6 Brookdale facilities to deliver required care services (*i.e.*, the degree to which each facility was understaffed on a per day basis).

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[37] As previously defined, the actual staff hours are derived from every job title variety of Care Manager, MedTech, LPN, and Care Director.

[38] For a healthcare facility that has sufficient staff to deliver the care required, the available care hours should be above or in close proximity to the required care hours. Accordingly, if the results were graphed, the available care hours line (red) would be above or very near the required care hours line (black).

Anaheim DES Testing Results

Required staffing hours vs. available staffing hours

[redacted]

Table 1 *(Anaheim Gap Chart)*

Brookhurst DES Testing Results

Required staffing hours vs. available staffing hours

[redacted]

Table 2 *(Brookhurst Gap Chart)*

Mirage Inn DES Testing Results

Required staffing hours vs. available staffing hours

[redacted]

Table 3 *(Mirage Inn Gap Chart)*

Irvine DES Testing Results

Required staffing hours vs. available staffing hours

[redacted]

Table 4 *(Irvine Gap Chart)*

New Euclid DES Testing Results

Required staffing hours vs. available staffing hours

[redacted]

Table 5 *(North Euclid Gap Chart)*

Scotts Valley DES Testing Results

Required staffing hours vs. available staffing hours

[redacted]

Table 6 *(Scotts Valley Gap Chart)*

87. The above line-graphs generated from MedModel's DES testing and failure analysis shows the prevalence and the degree of understaffing at Brookdale's facilities. Significantly, on each of the 3,264 days that these 6 Brookdale California facilities had complete or substantially complete data, MedModel's DES testing and failure analysis revealed that they were systemically understaffed, failing to provide sufficient numbers of staff to meet resident needs. On every day tested, the time required by staff to deliver line-item care services (black line) exceeded the time staff had available to deliver that care (red line).

88. **<u>Average Shortfall of Staff Hours Per Day</u>**: MedModel's DES testing and failure analysis reveals the extent to which each facility was understaffed on a per day basis for the days where Brookdale produced complete or substantially

complete data over the 3-year period. *See* Best Case Results, MEDMODEL0012 through MEDMODEL0017, and Gap Chart and Table Data, MEDMODEL0018. The summary below shows these average per day staffing deficits (measured in hours):

[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]

Table 7 *(Average Daily Deficit Analysis for Days Where Brookdale Produced Complete or Substantially Complete Data Over the 3-Year Period)*

89. **<u>Total Shortfall of Staff Hours</u>**: In this case, MedModel's DES testing and failure analysis revealed the extent to which each facility was understaffed on the days where Brookdale produced complete or substantially complete data over the 3-year period. *See* Best Case Results, MEDMODEL0012 through MEDMODEL0017 and Gap Chart and Table Data, MEDMODEL0018. The summary below shows these total deficits of staffing hours for each of the 6 Brookdale facilities for those specific days:

[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]

Table 8 *(Total Deficit Analysis for Days Where Brookdale Produced Complete or Substantially Complete Data Over the 3-Year Period)*

90. **<u>Amount of Staff Travel Time and Travel Distance</u>:** The summary below which derives from the DES testing and failure analysis shows: (a) the average per day amount of time staff was required to travel within the selected facilities in order to deliver line-item care services and (b) the average total distance staff was required to travel within these facilities in order to provide this care per day for each of the 6 Brookdale facilities over the 3-year timeframe (*see* Best Case Results, MEDMODEL0012 through MEDMODEL0017 and Gap Chart and Table Data, MEDMODEL0018):

[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]

Table 9 *(Staff Travel Time and Travel Distance Analysis)*

Brookdale's staffing methodology does not sufficiently account for the amount of time staff is required to travel to deliver line-item care services within its facilities and the total distance staff is required to travel in order to provide this care. This failure to sufficiently account for staff travel time and travel distances significantly contributed to Brookdale's systemic and chronic shortfall of staffing.

91. **<u>Percent of Service Time Omitted Analysis</u>:** The summary below which derives from the DES testing and failure analysis shows the percent of required time for line-item services that was mathematically impossible for the available staff to deliver. This percentage is calculated by dividing the number of hours of omitted care time by the average total staff time *required* per day. The summary below displays the percent of omitted care time for each facility on an average daily basis (*see* Best Case Results, MEDMODEL0012 through MEDMODEL0017 and Gap Chart and Table Data, MEDMODEL0018):

Name of Facility	Percent of Required Care/Service Time Omitted AL Unit	Percent of Required Care/Service Time Omitted MC Unit	Percent of Required Care/Service Time Omitted Full Facility (AL + MC)
Anaheim	40.1%	41.8%	40.8%
Brookhurst	48.6%	51.4%	49.9%
Mirage Inn	42.5%	49.8%	46.9%
Irvine	35.9%	N/A	35.9%
North Euclid	33.9%	N/A	33.9%
Scotts Valley	41.8%	N/A	41.8%

Table 10 *(Percent of Required Service Time Omitted Analysis)*

92. **Common And Systemic Understaffing**: Based on MedModel's DES testing and failure analysis, each of the selected Brookdale California facilities are similar: they were systemically understaffed, failing to provide sufficient numbers of staff to meet resident needs throughout the study periods. The common disparity at each of these Brookdale facilities between staff (hours of actual time available to deliver care) and workload (hours of required time) was so large that it was mathematically and physically impossible for Brookdale staff at these facilities to deliver all care and services required by residents. As a result, all Brookdale residents at these 6 facilities were placed at a significant and continuing risk of not receiving the required care services documented in their care assessments during the time period covered by the studied data.

93. Consistently, the workload at each of the selected Brookdale California facilities (care hours required by residents) far exceeded the actual staff hours available to deliver care at each facility. This shared staffing problem (the gap between required and actual hours) cannot be resolved without either (a) increasing staff hours, (b) decreasing the number of care service tasks (workload), or (c) a combination of both. More specifically, MedModel's DES testing and failure analysis scientifically determined that *only by increasing staff, decreasing workload, or both* did staff have the capacity to complete all work required. In other words, no

variables other than staffing and workload had enough impact to successfully correct the common problem created by Brookdale's staffing methodology and practices.

XII. APPROACH FOR ANALYZING OTHER BROOKDALE CALIFORNIA FACILITIES

94. As stated previously, assuming Brookdale has produced or will produce all the required resident assessment, move-out date, punch detail staffing data, and floor plans for all Brookdale's California facilities, the same DES testing and failure analysis performed for the above 6 selected Brookdale facilities (and described above) can be performed for all other facilities at issue in this lawsuit during the timeframe for which this or equivalent information is produced.

95. I reserve the right to revise my opinions and findings if additional relevant information is made available regarding the subjects of this declaration.

96. I declare under penalty of perjury under the laws of California and the United States that foregoing is true and correct.

Executed on August _14_, 2021, in East Longmeadow, Massachusetts.

Dale Schroyer

DALE SCHROYER